resonators 5 and capacitive gaps in the conducting strip 3.

Figure 4 shows the diagram corresponding to the frequency response 12 (insertion loss 12a and return loss 12b) of the filter 11 described in this invention, with three stages of split rings resonators 5, showing the low values of losses in the pass band 13 and the abrupt cut-out in the transition regions 14.

Band-rejection filters can also be made with a design identical to that described but without metallic connections 6 between the conductor strip 3 and the metallic ground planes 4.

With a suitable design of the structure dimensions, its radiation characteristics are enhanced, permitting it to be used as a free-standing antenna or in antenna groupings as shown in Figure 5, which shows a typical radiation diagram from a frequency of 6.5 GHz.

What is claimed is:

1. Filter for microwaves and millimeter waves, characterised in that it comprises a planar transmission medium (1) which includes a conductor strip (3), metallic ground plane (4) and dielectric substrate (2) and in that it includes at least one split rings resonator (5a, 5b, 5c, 5d, 5e and 5f).

2. Filter according to claim 1, characterised in that the split rings resonators (5a, 5b, 5c, 5d and 5e) are

metallic and are mounted in magnetic coupling with the planar transmission medium.

3. Filter according to claim 2, characterised in that there are metallic connections(6) between the conductor strip (3) and the metallic ground plane (4), behaving as a band-pass filter.

4. Filter according to claim 2, characterised in that the conductor strip (3) is electrically separated from the metallic ground plane (4), behaving like a band-rejection filter.

5. Filter according to claim 1, characterised in that the split rings resonators (5f) are metallic and are mounted in series with the conducting strip (3).

6. Filter according to claim 1, characterised in that said planar transmission medium (1) is based on conventional transmission lines (coplanar, microstrip, stripline) or variants thereof.

7. Filter according to claim 1, characterised in that the split rings resonators (5a, 5b, 5c, 5d, 5e and 5f) are etched in the metallic ground plane (4), making their surface the negative of that of the metallic split rings resonators (5a, 5b, 5c, 5d, 5e and 5f).

8. Filter according to claim 7, characterised in that for the split rings resonators (5a, 5b, 5c, 5d and 5e) capacitive gaps exist in the conductor strip (3), behaving as a band-pass filter.

9. Filter according to claim 7, characterised in that for the split rings resonators (5a, 5b, 5c, 5d and 5e), the conductor strip (3) shows continuity, behaving as a band-rejection filter.

10. Filter according to claim 7, characterised in that for the split rings resonators (5f), the conductor strip (3) shows continuity, behaving as a band-pass filter.

11. Filter according to claims 1, 2 and 7, characterised in that it includes metallic split rings resonators (5a, 5b, 5c, 5d and 5e) in magnetic coupling with the planar transmission medium (1) and split rings resonators (5a, 5b, 5c, 5d, 5e) etched in the metallic ground plane (4).

12. Filter according to claim 1, characterised in that the open rings (8) are of circular or polyhedral geometry and present a plurality of metallic elements and/or slits (7) etched into one or more levels of metal.

13. Filter according to any of the preceding claims, characterised in that it presents multiple pass- (13) or

rejection-bands, with band width controllable by means of the number of slits (7) and/or the arrangement of the split rings resonators (5a, 5b, 5c, 5d, 5e and 5f) and/or their geometry.

14. Filter according to any of the preceding claims, characterised in that it is electronically reconfigurable and has built-in microelectromechanical switches (MEMS).

15. Antenna for microwaves and millimeter waves that includes at least one filter according to any of the preceding claims.